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Ödsmå, Kville sn, Bohuslän

Hällristning Rock carving
Fiskare från Bronze age
bronsåldern fishermen



MEDDELANDE från
HAVSFISKELABORATORIET • LYSEKIL

nr
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The influence of the medusa, Tima bairdii, on
the deep sea prawn fishery in the Skagerak in
1966 - 1967.

by
Bernt I. Dybern

August 1967

The influence of the medusa, *Tima bairdii*, on the deep sea prawn fishery in the Skagerack in 1966 - 1967.

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Abstract

During the second part of 1966 and the first two months of 1967 the already before declining Swedish catches of the deep sea prawn, *Pandalus borealis*, reached their absolute minimum values hitherto. These bottom quotations were to a great part due to an unusual mass-appearance of the medusa, *Tima bairdii*, which influenced the fishery by making it difficult for the fishermen to sort out the prawns from the jelly-masses ^{or/} even to get the trawl on board. Since the number of prawns in the catches was regularly very small there is perhaps also reason to assume that the medusae disturbed the prawn-schools above the bottom thus causing a dispersal of the prawns.

The Swedish deep sea prawn fishery during the last few years.

Since 1963 the yield of the Swedish fishery for the deep sea prawn, *Pandalus borealis*, has successively decreased. In 1962 the prawn fishing boats brought more than 5000 ton to the harbours while in 1965 the yield was only about 3500 ton, in spite of the fact that the fishing efforts and the commercial demand for deep sea prawns were increasing during the period, c.f. Höglund & Dybern 1966.

In 1966 the catches further decreased, especially during the second half-year, the bottom quotations being reached during December. From March 1967, however, the tendency has been ascending and the situation has become about equal to that prevailing in 1965. In Fig. 1 this is elucidated in the form of the mean catches in kg/hour for some prawn-fishing boats, taking their catches in the north-eastern part of the Skagerak.

The cause of the long-time decline of the results of the Swedish deep-sea prawn fishery is not yet fully understood. It may be changes in the prawn stock caused by changes in the physical environment and/or overfishing. But there is

reason to assume that the bottom quotations from the middle of 1966 to the beginning of 1967 mostly depend on the interfering influence of the medusa, Tima bairdii.

The "blue jellyfish".

Tima bairdii, (Johnston) (Fig. 3) is recorded from the North Sea, Skagerak and Kattegatt, and, sporadically, from the Öresund and the Danish Belt Sea (Kramp 1937). It is presumably the medusa of a campanularian hydroid and is sometimes appearing abundantly (Newell & Newell 1963), and has been described as a kind of indicator-form for typical North-Sea water (Frazer 1962). In the Skagerak it normally becomes visible from the late summer to the winter, successively growing bigger, reaching a maximum size of 8 - 10 cm.

Tima has a very thick mesogloea which makes it similar to jellyfishes as Aurelia aurita. It is well-known among Swedish fishermen as the "blue jellyfish", because of the bluish transparency of the medusa-mass when poured out on the deck.

Tima-trouble in the Skagerak area in 1966 - 1967.

The abundance of Tima varies from year to year. It generally occurs from the surface water layers to about 300 m depth. Especially during the autumn it may be rather frequent in the trawl-catches of fish and deep-sea prawns but it is hardly ever a real trouble to the fishermen.

During the summer of 1966 it was evident that there was an unusually big number of small Tima outside the Swedish west coast. As they successively increased in size they were already in late August something of a problem for the fishermen, especially for those fishing deep sea prawns.

The trouble increased and reached its maximum strength during November-December 1966, when large-sized (6 - 10 cm) Tima-individuals occurred in enormous quantities at all depths down to ca 300 m and sometimes deeper.

During a December-cruise with R/V "Skagerak" to the prawn-trawling grounds in the eastern and southern Skagerak the catches consisted of up to 1000 kg Tima per one hours' haul at 200-300 m depth (Dybern 1967). For the rest they only contained a few fishes and prawns (c.f. Fig. 2). The following figures showing the result of a typical haul of one hour (the eastern Skagerak, 200 - 215 m) describes the situation very well.

Fishes, all kinds	2.11 kg
<u>Pandalus borealis</u>	4.31 kg
Other prawns	0.75 kg
<u>Tima bairdii</u>	600.00 kg

Normally in this place and during this time of the year one should expect several times as many fishes, at least three times as many prawns, and only a few Tima-individuals.

The prawn-fishing boats generally tow the trawl for several hours and, of course, the Tima-mass was correspondingly larger in their trawls. This caused mainly two kinds of troubles to the fishermen:

1. Difficulties in sorting out the prawns from the jelly-mass when put on deck.
2. On the whole big difficulties in getting the trawl on deck. Very often the fishermen had to open the trawl when it was floating at the side of the boat and to let the whole catch go back into the sea, either by opening the rear end of the trawl as usual, or by cutting out an opening in the side of it, after which it had to be repaired again.

Both kinds of troubles resulted in less catches both as a whole and counted in kg/hour.

The big quantities of Tima taken by the trawls during the late autumn and winter consisted mainly of old, more or less broken individuals without manubrium or other parts of the body. Certainly most of those individuals without capability to swim were taken close to the bottom. Since generally only a small number of prawns were found among the medusae in the catches there may perhaps be reason to assume that the prawn-shools were disturbed by all the drifting jelly-lumps, resulting in a dispersal of the prawn-individuals, also with less catches as a result. In the same way it is also conceivable that many fishes avoided the Tima-crowded bottoms.

It is, of course, difficult to evaluate the exact damage caused by the medusa-masses to the Swedish prawn fishery. But we know that many fishing-boats periodically had to adjourn their fishery for one, two or even more days because of the "jellyfish plague" and that those attempting to fish most of the times landed unusually small catches, sometimes only a few kg after three days' trawlings. Some fishermen, already before thinking of leaving off the prawn-fishery because of the bad catches of the last few years, now definitely gave it up.

When the medusae disappeared at the turn of February, the prawn-catches became bigger. There is thus good reason to assume that the bottom quotations from the second halfyear of 1966 to February 1967, shown in Fig. 1, to a very great extent was due to the Tima-plague. Bad weather conditions certainly also contributed to the small catches, but those conditions still remained during the spring of 1967.

The Tima-occurrences as a whole.

Tima is endemic for the North Sea and ^{the/}adjacent waters. Scandinavian fishermen fishing in the North Sea proper have reported unusual numbers of individuals periodically appearing also there. The prawn fishery of southern and southwestern Norway and of Denmark were influenced in a way similar to the Swedish prawn fishery.

The medusae spread in great quantities to the Kattegatt too, and many of them were brought by the currents through the Belt Sea to the southern Baltic. As late as March 1967, during an expedition with R/V "Thetis" several dead individuals were found as far east as the Slupsk furrow (Stolpe furrow) north of the Polish coast.

As mentioned before the number of Tima medusae in the Skagerak varies from year to year but no Swedish fisherman has ever seen an invasion like the one of last year. The causes of this mass-appearance are not yet understood. Tima is said to prefer rather cold water and perhaps one may be permitted to connect the richness of individuals with the inbreak of rather cold ($1 - 1.5^{\circ}\text{C}$ below normal) North Sea water into the Skagerak during 1966 (Svansson 1967), but such inbreaks have happened before without such a strong influence on the Tima-occurrences. And the question also remains why the medusae were numerous in the North Sea proper.

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Fig. 1.

Mean catches in kg/hour for some Swedish prawn-fishing boats in the northeastern part of Skagerack.

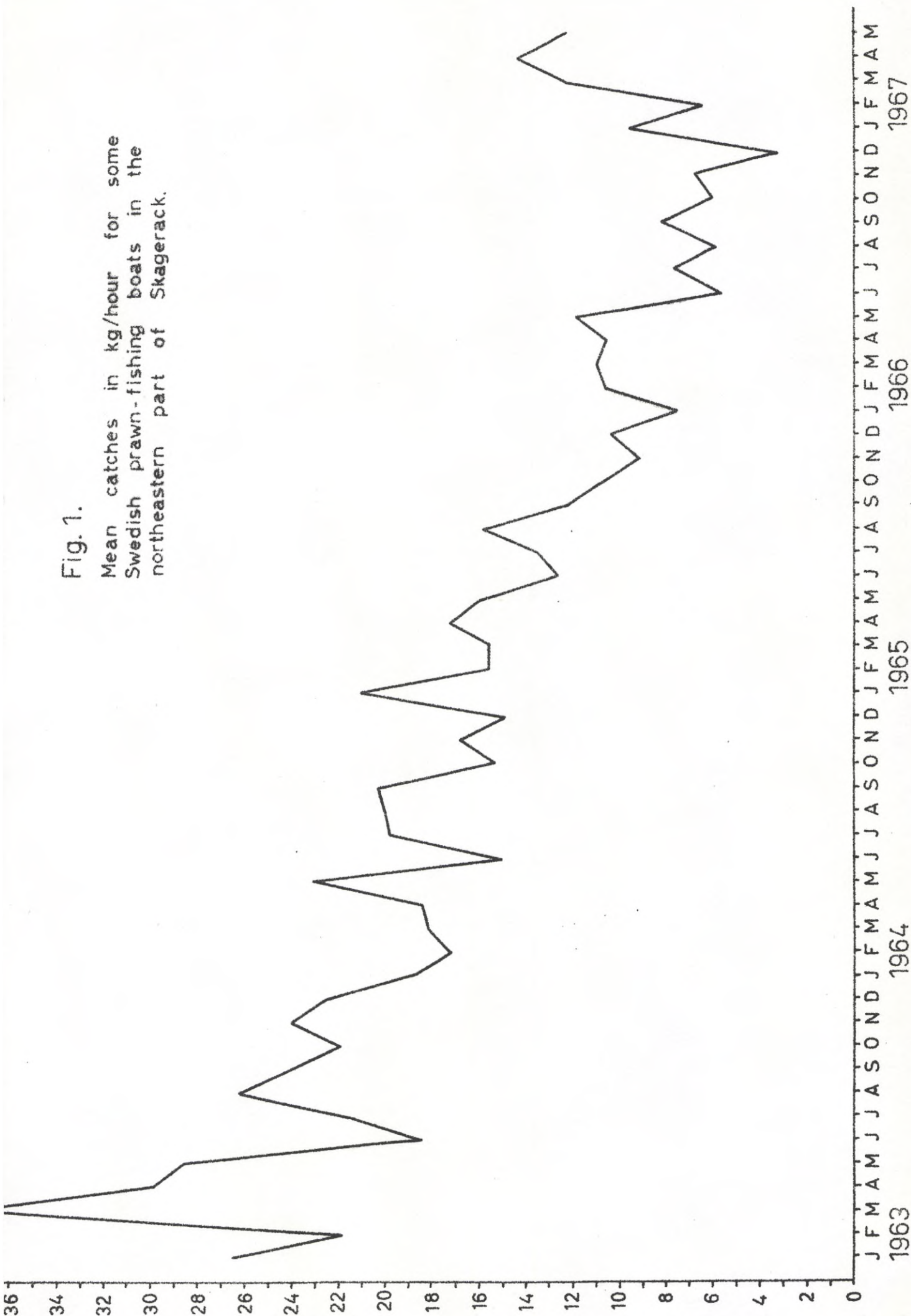




Fig. 2.

Tima as the main constituent
of a trawl catch, December 1966.

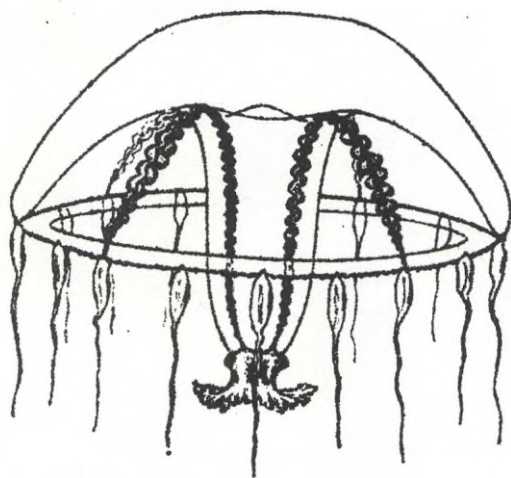


Fig. 3.

Tima bairdii. After Kramp.

